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Psycholinguistics & Linguistics: The How and Why of Language

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Honors Special Study

PSYCHOLINGUISTICS--LINGUISTICS
The How and Why of Language

submitted by Belinda Kelly
to
Dr. Weldon Vogt
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LINGUISTICS--PSYCHOLINGUISTICS: The How and Why of Language

Introduction

Communication has proved to be an essential facet of life. Language has been with us a long time. Every normal person in the world eventually will talk. By virtue of this fact, every person--civilized or uncivilized--carries through life certain ideas about talking and its relation to thinking. These notions, naive but deeply rooted, tend to be intolerant of opposition because of their firm connection with speech habits that have become unconscious and automatic. We use language to communicate meaning or to send a message from one person to another. But how is this "communication code" developed? Is it acquired? Why do we say things the way we do? How do we put sounds and words together to form a complete thought? Why do we use the specific forms we do?

In both education and psychology there are strong indications of renewed interest in language as a subject matter in its own right and as an important domain of human behavior. Beyond the application of linguistics to the teaching of grammar, reading, and foreign language, there are investigations of language and thought in European, American, and Soviet psychology and education that may considerably improve our knowledge of how language is acquired and how it relates to thought.

The following discussion will attempt to define linguistics and psycholinguistics, briefly discuss how we acquire language (including various developmental theories), psycholinguistic components involved, and present a basis for instruction in language and thought. As I have studied and researched this area, I have found much of the information to be well above my comprehensive abilities. This paper in no way reflects my knowledge but is an attempt to learn and understand more of the complicated but very interesting field of psycholinguistics.

Many teachers, speech pathologists, and other educators are encountering the linguistic revolution. What is linguistics? It is not a new phenomenon, but an old and respected scholarly field. The branch of linguistics affecting educator's curriculum today evolved early in the twentieth century. The linguist we are concerned with is not the linguist who speaks and teaches many foreign languages, but the language scientist who investigates how language functions. The linguist operates scientifically--he learns how language functions by observing and recording the way people use the language and by studying the structure and history of language.¹ The field is constantly undergoing changes and new discoveries often contradicting earlier information.

How is linguistics defined? Gerald Duffy "defines linguistics as....field which scientifically observes

language in action as a means for determining how the language developed, how it functions today, and how it is currently evolving."² The linguist determines the code of the message, the characteristics that distinguish one message from another. Each method of communicating meaning is dependent as a code system. Peter Jalus defines linguistics as "the study of language as a human phenomenon. The essence of language is speech and the psychological realities underlying it."³ "Linguistics has been defined as the scientific study of language because the empirical methods of the sciences are employed as much as possible in order to bring the precision and control of scientific investigation to the study of language."⁴

General linguistics is concerned with such questions as how the linguist defines his object of study; the properties he assumes all languages must have; how these are best described and compared; and especially, how such a description differs from the traditional approach to language taken in most of our school grammars. It includes a search for the most universal features of human languages. General linguistics should also focus on theories and descriptions of language.

Linguistics attempts to describe the structure of a language, the elements can be used to communicate information. A linguistic description contains the information which is necessary to understand and create utterances in a language.

Therefore, it can be seen that a language user must know how to create and understand utterances in order to engage in successful verbal communication. In some sense, then, a linguistic description is a description of what it is that a person who knows a language knows--linguistic competence.

Since language is viewed as a code system, a number of language characteristics can be attained. First, language is a commonly agreed-upon series of signals. The major signals in speech are speech sounds. The linguist points out that, "like all codes, is arbitrary. Language is similarly viewed as systematic also. In language the same designs such as recurring sentence patterns are repeated over and over again to constitute a system. An example of the system at work is the young child who invariably without instruction, puts the few words he knows together in a manner which communicates. The child will say, "Daddy bought a tie," but he will almost never say, "Tie a Daddy bought."⁵ Further, language is a symbolic representation of reality--a group of symbols which stand for something else. Linguists characterize language as being complete. Language is always developed to the point where a speaker can make a response to any experience he may undergo. And finally, language is like other code systems--it is learned. Language is not something we are born with. We learn spoken language through a process of imitation in our young years. We would not learn to speak the language if we were never exposed to it.

Eric Hamp describes the two basic assumptions of linguistics: 1) that language as a set of signs or as a code can be described quite apart from meaning or what the signs or codes refer to in the objective, personal, or social world; and 2) that the spoken language (the sounds of language) precedes and is more fundamental in the description of the language than are the peculiar characteristics of the written language.⁶

The complexity of language can be seen by examining the signals which have meaning in spoken language and the nature of writing as it relates to speech. The speaker of the language uses a variety of sounds in an extremely complex manner to communicate meaning (phonemes). Further, the speaker can produce sound combinations, such as the prefix "dis" or the ending "ed", which have independent meanings by themselves (morphemes). Still more complex is the manner in which the speaker can arrange words to obtain meaning. For instance, a speaker who can produce the words "John," "Sam," and "hit" still must decide whether "John hit Sam" or "Sam hit John" is correct according to the meaning he wishes to signal.⁷ Meaning is not only conveyed by what is said, but also by how it is said. Sound patterns can be varied to imply complimentary meaning or voice inflections can denote sarcasm into the same statement. Even more complicating is the fact that the speaker often uses more than sounds, sound combinations, and voice inflections to communicate his message--in understanding

sounds we must understand gestures and movements of the speaker.

The complicated nature of language is apparent when considering the complexities already described as a part of only one language code--the spoken code. Writing is a second language code embodying numerous complexities of its own. The linguist operates by a basic belief that all aspects of language originate with the spoken code. It represents the highest manifestation of intelligent use of the language.

We communicate meaning in spoken English through the use of a variety of signals. The linguist generally categorizes these signals into five groups--phonology, morphology, syntax, suprasegmental phonemes, and kinesis.

The first and lowest level of speech signal is phonology, which deals with the system of speech sounds. The phoneme is considered to be a speech sound which makes a difference in meaning. We can look at the words "dime" and "dine"--the meanings of the two words are quite different yet they sound alike except for the /m/ and /n/. The /m/ and /n/ make a difference in meaning, therefore, they are phonemes.

The sounds of a language can be described in three principal ways according to: 1) their composition, 2) their distribution, and 3) their function. Phonetics is primarily concerned with the composition of sounds, while phonemics treats the distribution and function of sounds.⁸ Phonemes

are classes of sounds that contrast with other classes of sounds. A single phoneme in a language can be described as a class of sounds whose phonetic differences are incapable of distinguishing one meaning from another. There are around 45 phonemes in the English language. The differences among the members of a phoneme class are called allophonic differences, and the members of the phoneme class are called allophones.⁹ Allophonic differences in English include the presence or absence of aspiration, degree of lip rounding, degree of muscular tension or laxness, length, and some degrees of fronting or backing according to certain environments. Phonetic components required to distinguish meaning are called distinctive features--phonemes are sometimes defined as "bundles of distinctive features."¹⁰

The phoneme is therefore a unit of contrast in a language. It merely signals a difference in meaning without carrying a meaning of its own. An example is the difference between two names, "pat" and "bat." Linguists need not examine in detail the meaning of these two words. It is sufficient that they know that the two words are meaningful and that they mean something different in order to establish the signal for the difference between the sounds represented by /p/ and /b/.

Speech consists of a succession not only of units of sound but also of units which convey meaning to the speakers of the language. The only way to test for meaning is by

collecting large quantities of continuous speech from a given speaker. As we collect more and more specimens of speech, we find increasingly large numbers of segments of varying lengths that differ only by small fractions: the house, the red house, the big red house, the big red house where my brother lives, and so on. Linguists call these segments morphemes.

So while phonology deals with sound in language, morphology is concerned with the meaningful forms made from the individual speech sounds. Morphemes are more difficult to define and identify. Hamp develops the idea of morphemes in connection with meaning. All longer segments of language are built up from morphemes, just as morphemes are built up from phonemes. Linguists tell us that words are constructed of two kinds of morphemes. One morpheme can stand alone as a meaningful unit such as the word "boy." It is considered to be a "free morpheme." In the word "boys," the plural "s" is also a meaningful unit because it changes the meaning of the word "boy" to more than one. However, "s" cannot stand by itself in the way boy can, so it is considered a "bound morpheme." Obviously, the manner in which we use morphemes will influence how well we communicate the message we wish to send. Let's consider these sentences:

The boy went to the movie.
The boys went to the movie.

The addition of the bound morpheme "s" in the second sentence above makes a crucial difference in the message being sent.

We know now that the boy did not go to the movie by himself but with companions.¹¹ Traditionally morphology is concerned with the use of roots, prefixes, suffixes, and inflectional endings as they influence meaning. Linguists place emphasis on the elements of structural analysis as they operate within the overall language code. Emphasis is on the manner in which structural elements serve as signals of meaning in communicating messages with the language code.

Syntax is concerned with putting words together in a meaningful order. The child learns the speech sounds (phonological aspects) of the language and how to use words and word parts (morphological aspects). Then he brings these elements together to form word combinations and sentence patterns which communicate meanings. Linguists label this process as syntax--what teachers refer to as "grammar." The traditional approach to grammar has emphasized the naming of parts of speech, the tearing apart of sentences and the memorization of grammatical rules. The focus has been on when to use words and has emphasized how the language should be used, rather than how it actually is used. The linguistic approach emphasizes a scientific description of the way sounds and words are used to communicate meaning. Our language today depends almost exclusively upon word order to communicate meaning. The linguist's belief that syntax of English can no longer be based upon the grammatical rules of Tatem and his interest in describing grammatical principles have resulted in two approaches to syntax which differ

dramatically from traditional grammar.¹² These two approaches are generally called "structural grammar" and "transformational generative grammar."

There are two levels of signals in a sentence. The first is the lexical, or dictionary, meaning carried by individual words. The second level of sentence signals are embodied in the grammatical structure of the sentence. The linguist emphasizes that the lexical meanings must be supplemented by structural signals in order for the speech order (phonemes) and sound combinations (morphemes) to communicate effectively.¹⁵ The structure of the sentence provides clues. Meaning can be conveyed even in a nonsense sentence like "The rinky bink boofed his blap," by structural clues. This example emphasizes the idea that separate words in a sentence communicates little meaning by themselves. There must be some kind of structural pattern of words to communicate. Structural clues to meaning include the word order used, the word endings which show plural form, tense, and word class. We no longer identify a part of speech by definition but by the role the word performs.

Most current linguistic theories propose that underlying the sentences of a language are rather elaborate syntactic structures. Some may wonder how the structure of language could possibly be so complicated--after all children learn to talk at an early age. There are several simple and superficially plausible theories which will be briefly described and disposed of in order to then define the complexity of current theories.

One simple and attractive theory of language associates utterances as responses to stimuli. Utterances are said to be constructed by stringing, from the store of responses-- words, phrases, simple sentences--responses together. The sequential order of the responses is determined by the stimuli. If this were so there would be little need for syntax for linguistic structure would just be a catalog of potential responses. This model cannot account for the complexity of actual sentences. Stimuli occur relatively independently of each other, so their order does not explain the strong sequential interdependencies found in English sentences (Lashley, 1951).

Another theory of syntax is the observation that a sentence may be extended into an unlimited number of new sentences through the expansion of one of its elementary parts.¹⁵---utterances as substitutions in patterns. This is the structural grammar approach to language. In structural grammar the linguist is concerned with the manner in which arrangements of words can communicate meaning. The grammar of a language enumerates or generates the sentences of that particular language. It does this by means of a finite number of rules, called grammatical rules. The possibility of expansion suggests a theory in which the syntax of a language consists of a set of basic patterns or sequences of substitution points--at each point either a word or another pattern can be substituted.

The set of items which may be substituted at a particular substitution point is called a constituent. Individual phrases which make up the constituent noun phrase may themselves be analyzed as sequences of constituents. A noun phrase, for instance, may consist of a proper noun (N pr) or a determiner (Det) followed by a noun (N). A determiner may be either a or the. The constituent noun may be either a single noun, an adjective (adj.) followed by a noun, or a noun followed by a prepositional phrase (PP). A prepositional phrase consists of a preposition followed by a noun phrase. Defining a sentence (S) as a noun phrase followed by a verb phrase (VP) and defining verb phrase as a verb (V) followed by a noun phrase completes a grammar for a small fraction of the sentences of English.¹⁶

This grammar may be written formally as a set of phrase structure rules (Chomsky, 1963). The function of the rules is to define which constituents of sentences are superordinate to which other constituents, to establish the order of constituents, to display the grammatical elements of the sentence (NP), and to define the basic grammatical relations.¹⁷ Grammatical rules represent linguistic structure. Chomsky has formally written the phrase-structure rules as follows:

- a. S ----- NP VP
- b. VP ----- V NP
- c. NP ----- N pr
- d. NP ----- Det N
- e. N ----- Adj N
- f. N ----- N PP
- g. N ----- man, spectrograph, theory...

- h. PP ----- Prep NP
- i. Det ----- a, the
- j. Adj ----- green, tall
- k. V ----- ran, saw
- l. Npr ----- Harvey, George
- m. Prep ----- in, on, near

Linguists have observed that most English sentences follow specific patterns utilizing these phrase-structure rules. The arrow (-----) means rewrite or replace the symbol on the left by the sequence of symbols on the right. The generation of a sentence starts with the symbol S and each line is derived from the preceding line by applying one of the phrase-structure rules. The simplest sentence patterns in English are the noun-verb pattern and the noun + verb + noun pattern, both of which can be expanded using phrases.¹⁹

When applying these rules a derivation may be terminated when all the symbols in the final line belong to the terminal vocabulary. The last line is called the terminal string and is generated by the rules of the grammar. The following is an example of the use of these rules to generate a terminal string:²⁰

Derivation	Rule Used
NP VP	a
NP V NP	b
NP Saw NP	k
NP Saw Npr	c
NP Saw George	l
Det N Saw George	d
Det Adj N Saw George	e
Det Adj N PP Saw George	f
Det Adj N Prep NP Saw George	n
Det Adj Adj N Prep NP Saw George	e
Det Adj Adj N Prep Det N Saw George	d
Det Adj Adj N Prep Det N Saw George	i.

The tall	Adj	N	Prep	Det	N	saw	George	J
The tall	green	N	Prep	Det	N	saw	George	J
The tall	green	man	Prep	Det	N	saw	George	g
The tall	green	man	on	Det	N	saw	George	m
The tall	green	man	on	the	N	saw	George	i
The tall	green	man	on	the	spectograph	saw	George	g

The tree diagram, the surface structure of the sentence, provides important syntactic information. It indicates how the elements in the sentence are grouped together. For example: the ambiguous sentence, "Time flies." is shown in the following illustration.

a.	S	b.	S
	N V		V S
Time	Flies	Time	Flies

In this case, the groupings for the two interpretations are identical; the difference in meaning can be represented by a difference in the labeling of the nodes in the tree diagram.

It is true that a surface-structure tree is a good representation for much of the syntactic information of a sentence, it represents information which is necessary for stress and intonation patterns, but within the last 10 or 15 years it's limitations have been recognized.

The following ambiguous sentence illustrates one of the limitations of the surface-structure tree as a representation of syntactic information:

The lamb is too hot to eat,
This sentence can be about the lamb eating something or about something eating the lamb. Both of these interpretations

would probably be assigned identical surface trees. Therefore, the tree diagram would not contain sufficient information to determine the meaning of the sentence. The tree diagram does not indicate whether lamb is the subject or object of eat. Now as the importance of grammatical relationships such as subject and object is realized, the limitations of surface-structure trees as representations of syntactic information become obvious. This and other difficulties suggest that a more complex theory of grammar is required. One theory which, linguists are now very interested in, is the theory of transformational grammar developed by Chomsky (1957, 1965).²¹

While the transformational grammarian builds on much that the structuralist has discovered about syntax, he is not completely satisfied with the structuralist's explanation of how the meaning is communicated in sentences. The transformational grammarian goes beyond the structuralist's description by exploring how sentences are generated in the first place.²² This means the transformationalist tries to explain how the speaker understands what is meant by a sentence even though he has never heard the sentence before in his life.

H. A. Gleason defines a transformation as "a statement of the structural relation of a pair of constructions which treats that relation as though it were a process....it is normally stated in the form of rules which may be applied to one of the pair--an input--altering it to produce the other--

an output....transformations are directional. Some can be described in either direction, though practically we must choose one."²³

The following sentence pairs demonstrate this idea:

John is writing a letter. John isn't writing a letter.
His father walked home. His father didn't walk home.
The car runs well. The car doesn't run well.

If we could find a single clearly statable rule to cover these sentences, this would be an example of a single transformation. The first sentence--a simple rule is evident--n't is added as a suffix to the first word in the verb phrase. The second sentence follows a different rule, before the n't is added, walked is changed to did walk. Comparable changes were made in the third sentence.

When carried out consistently, the ideas sketched above along with many more complex transformations (too complex for the scope of this paper) result in a grammar quite characteristic in its organization and form of statement. Gleason describes this as a transformational grammar which is claimed by some linguists as a type of statement attaining to a "degree of precision, completeness, and conciseness not possible in any other way--....this technique can overcome certain limitations which are inherent in any other known form of description."²⁴

These claims are not universally accepted. Both the technique and the claims imply a certain distinctive general theory of linguistics.²⁵

1. A transformational grammar is organized in three sections. The first of these describes certain strings of comparatively simple structure--the phrase structure segment of the grammar. The second transformational section describes all the transformations by which the output strings of the first section of the grammar are carried into terminal strings--sufficient in number to underlie all of the sentences of a language. The third is the morphophonemic section, describing all the processes by which terminal strings are given shapes which can be identified as utterances or portions of utterances. Any transformational grammar must have all three. The transformational section may be by-passed in some sentences; the other two cannot.

2. No matter of phonemic form comes in until the morphophonemic portion of grammar, therefore the greater part of the statement is in terms of quite abstract symbols. A transformational grammar is not, however, properly any more mathematical than any other type of grammar in its basic features.

3. The statement is largely in the form of a set of rules referred to as rewrite rules: $X \rightarrow Y + Z$ or X is to be rewritten as $Y + Z$. They have the effect of changing a symbolization in the direction of making it more specific.

The rewrite rule is one type of rule applying to any string wherein the proper symbols are found. The second rule

is the transformational rule which operates only on certain symbols in certain places within a constituent structure.

4. Transformational grammars are generally very explicit about the conditions under which any rule can be applied.

Phrase structure grammar is based on rules of formation which rewrite symbols into other symbols, like the rule: S --- NP + VP. The additional level which Chomsky and his followers have developed is based on rules of transformation which are rules for rearranging elements. Consider this sentence and a corresponding question:

1. The boy hit the ball.
2. What did the boy hit?

These two sentences are obviously related, but phrase structure grammar does not reveal the relationship. How is the question (2) related to the declarative (1)? The question word "what" asks a question about the object of the verb "hit." In (1) the object of that verb is "the ball," and it follows the verb. In (2) there is no object, and the question word appears at the beginning of the sentence. Apparently "the ball" and "what" play similar roles in relation to the verb in the two sentences. In transformational terms, a question of this sort is formed by replacing the object noun phrase by an appropriate question word and moving that question word to the front of the sentence. The type of element which is rearranged, a noun phrase, is an element revealed by the constituent analysis procedures of phrase structure grammar.²⁶ It is clear to see that two sorts of

rules will be needed: phrase structure rules generating deep structure, and transformational rules converting deep structures into surface structures.

Slobin defines a "transformation as an operation which converts one phrase structure into another."²⁷ It must be pointed out that not everything we know about a sentence is revealed in the superficial string of words which are uttered aloud, for example, an abstract auxiliary. This distinction between underlying and superficial linguistic structure, or "deep" and "surface" structure, is one of the major contributions of transformational grammar.

Transformations do not have to operate on single symbols. They add or delete elements, or substitute symbols--or any combination of these.

Salus says, "Unlike phrase structure rules, transformations are both context-sensitive and ordered. More than one transformation is required to generate a surface structure from any given deep structure. Each structure produced by the action of a transformation is a derived structure, and thus only the first of a series of transformations actually acts upon the deep structure, each successive transformation acting upon some derived structure. The derived structure produced by the last of a series of transformations is the surface structure. Every sentence generated has as many derived structures as transformations that are used."²⁸
(Appendix F) (Table A) 21(Salus P. 23)

All transformations must be formalized to be meaningful. The general form of transformational rules is that of a string of symbols followed by the double arrow (\Rightarrow) which is in turn followed by another string of symbols. The first string of symbols indicates the symbols to be operated upon by the transformation, as well as those symbols which are the rule's context. This string is the input to the transformation. The symbols to the right of the double arrow are the structures resulting from the application of the transformation.²⁹

As we have stated, the transformational component will consist of rules that will add, delete, or change the order of morphemes in the terminal strings produced by the phrase structure component. Chomsky has distinguished two kinds of sentences--the kernel sentence which contains obligatory transformations so transformations will be set up so that they can apply either to the underlying strings of kernel sentences or to strings already transformed by other transformational rules. Chomsky finds that a grammar which contains a transformational component will be essentially more powerful than description in terms of phrase structure.³⁰

The third type of rules (first being phrase-structure rule and second transformational grammar rule) used in grammatical descriptions is the morphophonemic rule. The nature of these rules are complicated. Peter H. Salus discusses this rule:

"The structures discussed thus far (phrase structure and transformational structure) can be linearly represented by words... the units out of which the utterances we have considered are composed, are well-formed. English words. Admittedly, we have oversimplified in this, frequently abstract markers, not words, are used. As such, the abstract markers have no phonological form, and the primary role of morphophonemic rules is to assign a phonological structure to these forms. Like transformations, morphophonemic rules are context-sensitive. The inputs to morphophonemic rules are surface structures and the outputs are phonological representations...the surface structure provides all the information necessary to pronounce the sentence it represents... the surface structure serves as the input to the phonological apparatus, and the output of these morphophonemic rules serves as the input to the actual vocal organs."³⁴

The morphophonemic component will rewrite the morphemic representation into a proper string of phonemes. with rules of the form X --- Y. Such rules for English would include:

- a. walk ----- /w k/
- b. take + past ----- /tuk/
- c. hit + past ----- /hit/
- d. /...D/ + past ----- /...D/ + / d/ (where 1 = /+/ or /d/)

and these rules must be ordered, but each rule need not be restricted to rewriting a single symbol.³⁵

This form of grammar takes a set of observed phenomena (for example, "grammatical sentences"), tries to formulate the laws by which these are related (for example, through

phrase-structure and transformational rules), and invents a mechanism by which we can predict new phenomena of the same type (for example, through the phrase-structure, transformational and morphophonemic components, which produce actual grammatical utterances).³⁶

Chomsky finds this provides us with a way of comparing and evaluating proposed grammars. This model should be preferred on grounds of simplicity--basically because its generalizations result in giving a more uniform representation of relations among linguistic elements at different levels.

The transformational model of grammar postulates a deep structure in which the meaning of a sentence and the relationship among its parts are more clearly represented than they are in the surface-structure model. The surface-structure model is a poor representation of all the syntactic relations and conceptual structures in the sentence. The deep structure is converted into a surface-structure by the transformational component of the grammar. Two of the important theoretical issues in transformational grammar concern the nature and origin of the deep structure and the form of the transformation's which convert the deep to the surface structure.³¹

Chomsky has said, "It is clear, in short, that the surface structure is often misleading and uninformative and that our knowledge of language involves properties of a

much more abstract nature, not indicated directly in the surface structure. Furthermore, even such artificially simple examples...show how hopeless it would be to try to account for linguistic competence in terms of habits, dispositions, knowing how, and other concepts associated with the study of behavior..."³²

Here a brief explanation of competence and performance is in order. Performance according to Chomsky is the actual acts of speaking and hearing, taking place in time, subject to various distractions, limited by memory and by the general weakness of human flesh.³³ Performance is linguistic behavior, either encoding or decoding speech. A theory of performance would be a psychological theory.

The second aspect of language is the knowledge of syntax, meaning, and sound that makes performance possible. Chomsky has called this competence. Competence is also a psychological theory. Piaget comes closest in characterizing the structure of logical thought. Because a grammar is concerned with knowledge, not behavior, factors (such as memory limitations, time restrictions, etc.) that are important to performance can be disregarded when thinking about competence. Competence is an idealization, an abstraction away from performance. Theories of performance and competence deal with different topics. Linguistic competence is a model of what is assumed to exist in the mind of the speaker--a model built by the linguist on the basis of his intuitive ability

to discriminate well-formed from ill-formed utterances. The plausibility of its existence can be assessed only through a careful study of the actual performance which it is believed to determine.

Human linguistic behavior must be influenced by a variety of factors. To the extent that performance is predictable, the plausibility of that theory is enhanced; and, by deviating in regular fashion from the base-line predictions of that theory, linguistic performance may reveal important psychological factors involved in the passage from competence to performance.³⁷ This begins our discussion of psycholinguistics.

Most psychologists are aware of the fact that the human mind operates on linguistic symbols. Similarly, most linguists have always admitted that some sort of psychological drive must set the grammatical powers into motion. The interaction of these attitudes is the area of psycholinguistics.³⁸

Psycholinguistics concerns the relation between messages and the characteristics of the persons who select and interpret them. The psycholinguist studies the encoding and decoding processes of human individuals. Just as the linguist studies messages, the psycholinguist studies communicators. This combines the study of language and thought.³⁹

Chomsky's transformational grammar is of major importance in the study of language and thought, or psycholinguistics.

The transformations to which he refers are a combined product of linguistic structure and psychological processes within the speaker. Chomsky describes generative grammar as "... simply a system of rules that in some explicit and well-defined area assigns structural descriptions to sentences. Obviously, every speaker of a language has mastered and internalized a generative grammar that expresses his knowledge of his language. This is not to say that he is aware of the rules of the grammar or even that he can become aware of them, or that his statements about his intuitive knowledge of the language are necessarily accurate. Any interesting, generative grammar will be dealing, for the most part, with mental processes that are far beyond the level of actual or even potential consciousness; furthermore, it is quite apparent that a speaker's reports and viewpoints about his behavior and his competence may be in error. Thus, a generative grammar attempts to specify what the speaker actually knows, not what he may report about his knowledge."⁴⁰

Chomsky explains that a generative grammar is not a model for a speaker or a listener, but an attempt to characterize in the most neutral possible terms the knowledge of the language that provides the basis for actual use of language by a speaker-hearer.⁴¹ A particular generative grammar says nothing about how the speaker-hearer might proceed in some practical or efficient way to construct such a derivation. (These questions belong to the theory of language use--the theory of performance.)

Cayden (1967) discusses current research on individual differences in competence as undertaken by transformational linguists. He says that performance varies to a much greater degree among speakers than does competence. Remember. Competence is the knowledge of syntax, meaning and sound that makes performance possible.

Now we have discussed language structure and properties and briefly defined psycholinguistics. Before moving on to aspects of language and language pathologies, we will discuss language acquisition and development in early childhood.

There are numerous definitions of language disorders stating in one form or another that such disorders are deviations from normal language expectations. These definitions require knowledge of normal language behavior in order that valid judgments can be made about pathological language. Since linguistic "normalcy" is a function of age, the topic of language disorders must be viewed from a developmental framework. Remember before discussing this aspect of language, if we are to make valid judgments about linguistic pathologies in children, the judgments must be made in the context of the language system of the child's linguistic community.

The mystery of how a child learns to speak has intrigued and puzzled adults since the "beginning of time." The mental abilities of a little child seem to be rather limited in many

ways, yet he masters the exceedingly complex structure of his native language in the course of a short three to four years. It is even more unbelievable that each child, exposed to a different sample of the language, and generally with little or no conscious tuition by his parents, arrives at essentially the same grammar in this brief span. Each child rapidly becomes a full-fledged member of his language community, able to produce and comprehend an endless variety of novel yet meaningful utterances in the language he has mastered!

Until recently, behavioristic psychology looked upon language, and the task of first language learning, as just another form of human behavior which could be reduced to the laws of conditioning. The linguistic theory presented by Slobin for understanding language acquisition is the picture of a child who is creatively constructing his language on his own, in accordance with innate and intrinsic capacities--a child who is developing new theories of the structure of the language, modifying and discarding old theories as he goes.⁴² This picture differs radically from the traditional picture of a child whose learning is governed by variables such as frequency, recency, contiguity, and reinforcement. There are many theoretical disputes involved in language development, but the concern of this discussion is the facts of language acquisition.

Massive changes in the grammatical status of children take place between one-and-a-half and three years. The age at which studies can be conducted are therefore fixed. As a result, the bulk of study and observation information come from a simple method of tape recordings. The richest details and the deepest insights so far have come from longitudinal collections of speech samples. These studies have followed general linguistic development as well as the emergence of particular grammatical systems. Almost without exception, observational studies have been engaged with the production and not the comprehension of speech. Weir (1962), Braine (1963a), Brown and Bellugi (1964), Miller and Ervin (1964), McNeill (1966b), Grube (1967), and Bloom (1968) have all contributed in varying amounts to recorded and audio visual collections of material.⁴³

Typically, a small group of children is visited at home once or twice a month, and everything the child says and everything said to him is tape recorded. The reason for these visits is to collect a sizeable body of spontaneous utterances from a child. One then tries to write a grammar that covers a child's complete copy of language. The object is to capture the child's total linguistic system at the time the language sample is collected, without distortion from adult grammar.⁴⁴

The onset of speech and speech development is dependent on the pattern of motor development (Tenneberg, 1967)(Miller, 1951).

It specifies that Broca's area (the area of the brain which controls motor speech) does not typically develop until the seventeenth month, although other cortical motor centers are differentiated by the eleventh month. There appears to be corresponding "stages" of motor development for each "stage" of speech development. These stages are not separate distinct steps but distinctive points on a developmental continuum. The physiological correlates of these speech development stages are related to changes in size and structure of the articulating and resonating apparatus, as well as to development of motor coordination.⁴⁵

Brown and Fraser (1963) called the patterned speech of very young children "telegraphic." Certain words in communicating are systematically eliminated. In a sample collection of a child at 20 months, one finds that articles, auxiliary verbs, and inflections of every sort are missing--for example, "put suitcase...for?", "where birdie go?", "What innere?" and "Yep, it fit." Child speech may be telegraphic for the same reason real telegrams are--to save on costs. The least informative words are deleted by the child to save space in memory. This cannot be exactly true. Telegraphic speech is the outcome of the process of language acquisition, not the process itself.⁴⁸

The infant's early attempts at vocal communication are quite different from human language in important ways. The child infant has a repertoire of inborn noises expressing

many different need states. It will take a long time before vocalizations are used to designate objects or events, to ask and answer questions, etc. The earliest sounds of the child appear to be a part of nondirected bodily reflex responses to new physical environments. according to Taylor and Swinney. During the first month of life the child uses crying, whimpering, and contented vocal behavior, which are believed to serve as prerequisites for later phonetic development. At about 8 weeks of age, the child usually begins to engage in babbling (nonsocial sound production). These random sounds are governed by the maturation of the motor mechanisms which control the movements of the lips, tongue, and other articulators.

Following babbling, vocal play (social sound productions) appears around the eighth month. This usually includes echolalia which Van Riper (1963) discusses as occurring in month 10-11, and contouring (the utilization of correct adult inflection patterns with nonsensical articulatory utterances). This is one of the first linguistic features of adult language that a child acquires. Vocal play overlaps into the stage of purposive utterances, in which appropriate use of words or syllables occurs. This stage begins sometime near or before the end of the first year.⁴⁶

By the end of one year, the normal child can produce a number of clearly differentiated sounds. This is when parents begin to hear what they identify as "first words" coming out of the baby's babbling. These first words often have the

force of entire sentences and have been referred to as "one-word sentences."⁴⁷

Even before telegraphic speech is speech typical of the one-year-old. "Holophrastic speech" refers to the possibility that the single word utterance of young children express complex ideas, that ball means not simply a spherical object, but that a child wants that object, or that he believes he has created such an object, or that someone is expected to look at such an object.⁴⁹ The meaning of these "one word sentences" varies with the situation, so "mama" can mean "Mama come here," or "That's Mama," or "I'm hungry" or any number of things. We cannot yet speak of the child's active grammar because he has not yet combined his words into longer utterances. It is possible that he already has a "passive" grammatical system (Stage I). This means the child is learning the transformational rules of grammar which enable him to understand some grammatical patterns in adult speech, but not well enough to utter anything more than one-word sentences.

The description of child language has been developed under the impetus of transformational grammar according to Slobin. Children form a variety of word categories of their own based on the functions of words in their own language systems, and so words must be looked at in the light of the child's total system, rather than in terms of the adult system which he has not mastered.⁵⁰

The second stage may be one of "unmarked grammatical systems" in which certain regularities of grammatical sequences may occur.⁵¹ From this point the child's language is structured in a hierarchical structure. The child starts putting two words together at around two years and an investigation of his active grammar can begin. Ervin, Tripp, and Miller questions whether these are memorized sequences or a generation of novel sentences. Not only is the child's language in a hierarchical structure, also tends to be regular; the structures change with age and they do not always correspond to adult structures.⁵²

McNeill says, "When words are first combined a number of grammatical relations already exist. The new development is not the appearance of grammar, but the appearance of patterned speech to express grammar....patterned speech is a new phase in a child's constant effort to express grammatical relations."⁵³

The growth of two-word utterances is slow at first, but rapidly accelerates. Distributional analysis reveals that the child does not produce these utterances by mere unstructured juxtaposition of two words; rather, two classes of words are revealed by analysis. There is a small class of "pivot words" (Braine) or "operators" (Miller) and a large "open class" of words, many of which were previously one-word utterances. The "pivot" class of words are frequently used; the open class words are infrequently used. Words from

the pivot class almost always appear in combination with words from the open class and never alone or with each other. Words from the open class may appear alone and with each other. The two classes generally have complimentary membership and take fixed positions when combined. Pivot classes may appear first or second in sentences, but no word from a single pivot class appears in both places. The open class is quick to take in new vocabulary while the pivot class is slow to do so.⁵⁴ For example, a child may say things such as "boot in," "tape on," "fix on," and other sentences like this. The word on is a sort of "pivot" here--a large collection of words can precede it in first position. Or the "pivot" may be in the first position and open class words in second position--"more cookie," "more hot," "more sing," etc.⁵⁵

The main point is that the child already has a system of his own which is not a direct copy of the adult system. He has two classes of words--even though in adult language his words may fall into a number of classes (adjective, noun, etc.). The child's responses do not correspond with the adult's speech responses and do not look like reduced or delayed imitations of adult utterances. When we hear the charming utterances by children--"all gone sticky," "more page," "other fix"--we must realize it is unlikely that the normal parent speaks to his child in that way. More than likely the child is already using the limited linguistic means at his disposal to create novel utterances within his own simple but already structured system (Slobin).⁵⁶

Of course, his speech must bear some relation to the speech around him, but Slobin says it is definitely not just a reduced copy of the adult system.

The pivot analysis is only a description of the form of children's utterances. It tells nothing about the content of their speech. The most recent work on language acquisition is concerned with semantic questions. We are searching for relations between what a child intends to say and the form of his surface utterances. Other sorts of two-word sentences begin to develop. In some children there may be no discernible pivot stage. The child's system is organized on the two familiar levels--surface and deep. Through this description the rules the children follow in constructing sentences can be written out.

In 1970, Bloom found children using Noun + Noun structures to express different sorts of underlying semantic relationships; for example:

CHILD	ADULT
cup glass--conjunction	I see a cup and a glass.
party hat--attribution	This is a party hat.
Kathryn sock--possession	This is Kathryn's sock.
sweater chair--location	The sweater is on the chair.
Kathryn ball--subject-object	Kathryn will throw the ball.

By looking at the adult sentences one can determine underlying semantic relationships on the basis of their syntactic form. The meanings of the child's utterances cannot be unequivocally interpreted apart from the context in which they were uttered. So the development of syntax

makes it possible to speak of things which are not always evident in the nonlinguistic situation.⁵⁷ The child is limited to sentences of two words, but it is evident he is aware of the five semantic relationships expressed above.

Brown and his colleagues have studied linguistic competence in children--one specific child from two years to five years--at different stages in the form of generative grammar. At 28 months, the child had three grammar rules summarizing his performance. These rules describe one-, two-, three-, and four-word sentences. The first rule-- S ----- (NP) (VP)-- indicates a sentence consisting of a noun phrase or a verb phrase. Rule (2)--NP ----- $\begin{Bmatrix} P & N \\ N & N \end{Bmatrix}$ indicates first (P N)--a noun or a pivot plus a noun, or (N N) two nouns. Rules (1) and (2) apply to such sentences as ball, that ball, and Adam ball. Rule (3)--VP ----- (V) NP-- along with Rules (1) and (2) together apply in Adam want ball and Adam Mommy pencil. These sentences are a little less than two morphemes long on the average. Nine months later length has increased to nearly three morphemes on the average--but the grammar is much elaborated. Rather than three phrase-structural rules, there are now 14; rather than no transformational rules, there are twenty-four. (See Appendix.)

The complexity of the task facing the child in acquiring his speech has been made very clear. With each increment

in true grammar, it becomes highly complex. There is a continuity from the expression of grammatical relations with single words during the holophrastic period, through the use of simple word combinations, to the elaboration of grammar and transformational of rules. It can be seen, children follow a biologically unique path. Children develop the system of communication devoted totally to the communication of relations naturally and early.

THEORIES OF LANGUAGE ACQUISITION

The direction of current theory and research by psycholinguists in the field of language acquisition has been to emphasize universality and the existence of innate, biological determinants of this universality (supported by Chomsky, 1960, and Tenberg, 1967). There are many complex and heated arguments around the issue of innate factors in language acquisition. The impact of transformational grammar--along with recent work in etiology, perceptual and cognitive development and other areas--has revived the interest in nativistic aspects of the growth of intelligence. The problem of accounting for human language acquisition has been and continues to be central in this debate.

Theories of language acquisition must come to terms with the complexity of the task facing the child--especially the problem of discovering underlying structures and meanings of sentences (Slobin).⁵⁸ Several theories of language acquisition have been advanced to support the "facts"

surrounding language development during childhood. These theories take into account anthropological, sociological, biological, and psychological principles. A theory has not yet been presented which sufficiently accounts for both the theoretical assumptions of contemporary linguistics and the large body of empirical data on language development. Nevertheless, attempts have been made to explain both the necessary process and the facts associated with language growth.⁵⁹

There are three basic postures concerning first language acquisition. All of these deal primarily with linguistic production, not comprehension. This fact is unfortunate because comprehension has seemed to exceed production and is probably a more valid indication of linguistic competence.

Learning Theories

One basic theory has an empiricist or learning theory orientation. Only observable data are considered in the building of learning theories of language growth. These theories have the most extensive history. They are derivatives of performance learning models of observed behavior in animals and include various systems of stimulus-response contiguities. The theories in this classification range from single-state chaining (conditioning) of stimuli and responses to complex combinations of all learning theories.

The need for a learning theory in language acquisition arose so that psychology could get away from the "mentalist" reasoning and move towards introspection which was where much of human behavioral research was entrenched until the turn of the twentieth century.

The simplest of the learning theories is the Markov Processes which holds that any word in an utterance is dependent upon and determined by those words which have preceded it.⁶⁰ The process consists of the occurrence of left-to-right chaining of words through conditioned S-R connections (See Appendix.). Each word has a simple, theoretically determinable, probability of occurrence based on the strength of previous associations (habit formation) between any one word and those words preceding it.

This structure has been demonstrated to be an insufficient model of language behavior and of syntactic acquisition on several grounds. The left-to-right generator only has the "grammatical" rule that once a word (or group of words) is produced, the next word(s) is chosen from a set of probabilistically related words. Chomsky (1957) has shown that English sentences are not generated through serial dependencies; thus, eliminating Markov Processes as an explanation of syntactic development. Also, both the lexicon and syntax arise only through previous experience. This would mean a speaker (or listener) would have to hear each variation of word combinations at least once to establish sufficient contingencies to enable him to speak the potentially unlimited set of sentences he is able to produce. Finally,

this process would generate many drastically ungrammatical utterances.⁶¹ The Markov model does provide a potentially useful explanation of decision making processes for language.

Another learning theory is operant conditioning developed primarily by B. F. Skinner. He discusses language acquisition in terms of the principles of instrumental (operant) conditioning which he and others developed through laboratory research with animals. Operant conditioning consists of a model wherein responses are first emitted and then rewarded. This reinforcement contingency assures further occurrence of the rewarded response. The emitted response, for which there is no observable stimulus, is termed operant.

Skinner classifies verbal operants into different functional categories. A mand is a verbal operant where the response is reinforced by a characteristic consequence, therefore it is under the control of relevant conditions of deprivation or aversive stimuli. A tact is a verbal operant where the response is evoked (or at least strengthened) by a particular object. This response is under stimulus control. A tact is the response a child might emit when he sees an object. Echoic operants are where the response is under the control of prior verbal stimuli.⁶²

The basis of Skinner's approach to language acquisition is contiguity between response and reward (reinforcing stimulus). Skinner's system is much like the Markov process. It specifies the verbal unit with greatest response strength in a particular

situation so that lexical and phonological acquisition are presumed to result from verbal (or physical) rewarding of the child for saying a word-like sound(s). Rewarding gives the word a certain probability of future occurrence. Most undifferentiated verbal responses of a child are basically seen as being shaped by appropriate stimulus reinforcement.

Operant principles account for the development of syntax through the use of "chaining" of operants, where each operant is induced by its own specific cue. Another strength in this theory is that when an operant has been conditioned in one stimulus situation, it may occur without further conditioning in another stimulus condition by the process of generalization.⁶³

Chomsky in his "Review of Verbal Behavior" (Skinner, 1957) criticized Skinner on many levels. Chomsky asserts that verbalizations cannot be adequately discussed in terms of response strength as Skinner has described it. Skinner's response strength was defined as "probability of emission" and was determined primarily by frequency of occurrence of the R-S association. Chomsky noted, however, that response frequency is directly attributable to the frequency of occurrence of the controlling variables; thus, there is no "probability" involved in response strength--but each response is uniquely determined by occurrence of variables. What Chomsky argues is that the term "response strength" is merely used to give the appearance of objectivity to

Skinner's theory.⁶⁴ Foder (1965) discusses the pitfalls of operant principles as related to language. The R-S theory indicates that the name of an object which is present in the room as the speaker will be spoken with greater frequency than the name of an object not present. Foder is convinced there is no data to support this.⁶⁵

Chomsky summarizes his criticism of Skinner by stating that the operant model has yet to explain the fact that all normal children acquire essentially comparable complex grammars in a very short period of time. The operant model does not adequately account for novel utterances. More important, the model fails to account for the acquisition of comprehension of syntax.⁶⁶

Two other theories will be mentioned briefly. The insufficiency of a single stage E-R theory has led theorists to attempt to adapt two-stage learning models. Hull (1943) originated the mediation model. A proper proponent of the Hullian theory as applied to language is Osgood (1967). Specifically, the model can account for the production of an appropriate linguistic response in the absence of an overt stimulus which is particularly useful in accounting for acquisition of "word meaning."

Foder has opposed this theory stating there appears to be essentially no difference between single-stage and mediation theories. Along with single-state theories the mediation theory fails to handle comprehension, novel utterances, and the development of grammatically complex sentences.⁶⁷

Mowrer (1954, 1966) presents an S-R theory of language acquisition based on imitation and derived from observed animal behavior. This theory is based on the behavior of the "talking birds" who learn through stages of imitative behavior. Generally, Mowrer feels that through reinforced practice, muscular and neural patterns are established and, later, the motion of producing words triggers self-satisfying reinforcement. For this reason, this theory has been termed autistic.⁶⁸

Imitation models are open to criticism--the most obvious and important is that the models by themselves provide no means of accounting for comprehension and novel utterances. Comprehension cannot be imitated although a sentence may be orally imitated.

Integrated Theories of Learning have been developed as a result of the failure to explain aspects of language acquisition by traditional learning models. Staats (1968), Jenkins and Palermo (1964) have integrated many of the learning theories. These theories have been under just as much criticism as other learning theories. They also do not explain comprehensive behavior or grammatical novel sentence production.

Nativist Theories

Nativist theories of language acquisition, in general, hold that language maturation must be explained in terms of certain innate properties of the human organism, not on the

basis of experience and learning. Slobin states, "Psychological learning theories are constructed to deal with associations of stimuli and responses, but what the child acquires in the course of language development is not a collection of S-R connections, but a complex internal rule system."⁶⁹

According to Tenneberg, (1967), "The complexity of this task has made it plausible to postulate that the child's mind is somehow "set" in a pretermind way to process the sorts of structures which characterize human language, arriving at something like a transformational grammar of his native language. Therefore, the grammatical system itself is not given as innate knowledge, but it is felt the child has innate means of processing information and forming internal structures. When these capacities are applied to the speech he hears, he succeeds in constructing a grammar of his native language. Indirect evidence for this approach comes from, the fact that there seems to be a biologically determined "critical stage" for language acquisition in humans (during childhood) and that there probably are special structures in the human brain, lacking in all other animal brains, which perform language functions."⁷⁰

The bulk of the linguistic information used in this discussion have come from research done by Chomsky and also by McNeill--both nativist.

Chomsky holds that a rationalist approach which assumes an innate system capable of handling language is more tenable than learning models advanced by empirical psychologists. Chomsky's basic hypothesis is that children have no more control over the processes governing the development of linguistic rules for generating sentences than they have for, say, their visual perception. Chomsky (1965) and Katz (1966) have assumed the existence of a Language Acquisition Device (LAD) as one component of a total system of intellectual structures.⁷¹ The following quotes from Chomsky portray his personal convictions concerning language acquisition:

"....knowledge of grammatical structure cannot arise by application of step-by-step inductive operations (segmentation, classification, substitution procedures, association, etc.) of any sort that have yet been developed within linguistics, psychology, or philosophy....It seems plain that language acquisition is based on the child's discovery of what from a formal point of view is a deep and abstract theory--a generative grammar of his language--many of the concepts and principles of which are only remotely related to experience by long and intricate chains of unconscious quasi-inferential steps. A consideration of the character of the grammar that is acquired, the degenerate quality and narrowly limited extent of the available data, the striking uniformity of the resulting grammars, and their

independence of intelligence, motivation, and emotional state, over wide ranges of variation, leave little hope that much of the structure of the language can be learned by an organism initially uninformed as to its general character....

....On the basis of the best information now available, it seems reasonable to suppose that a child cannot help constructing a particular kind of transformational grammar to account for the data presented to him, any more than he can control his perception of visual objects....Thus, it may well be that the general features of language structure reflect, not as much the course of one's experience, but rather the general character of one's capacity to acquire knowledge in the traditional sense, one's innate ideas and innate principles."⁷²

McNeill also argues that the child must bring both formal and substantive linguistic universals to the language acquisition situation. He makes his argument on the basis of the claims advanced by Chomsky. McNeill advances his hypothesis on the basis of the apparent fact that one must know the deep structure of a sentence in order to comprehend its meaning. For McNeill, a theory of language acquisition must explain development of deep structures and the transformational rules which transform them into more complex surface structures. He postulates that a comprehensive theory of language acquisition must account for both comprehension and production. His assumptions permit

prediction of what will constitute a future verbal behavior. Further, it accounts for the fact that (1) the child's acquisition is rapid and regular, and (2) and language performance is realized as both comprehension and production.⁷³

Mixture Theories

Recently, various researchers have attempted to bridge the gaps between the nativist and learning viewpoints.

DeCecco states:

"If Chomsky and Skinner could accept the cue function of words as external stimuli that mediate internal processes, and if they could accept the possibility of behavior chains capable of both horizontal and vertical arrangements, their positions would not be as opposed as they now seem to be."⁷⁵

Fodor (1966) believes that the child is born with an innate propensity for learning specific principles and with some intrinsic structure for language. He views the child as receiving an enormous sample of grammatical and ungrammatical utterances from his environment. The child must induce deep structures for various sentence types. Fodor proposes that the child innately has the rules to assure that (1) only a small number of possible analysis is performed on a corpus of data (to fit with time considerations) and (2) the correct analysis is among these. The child is thought to have many rules for analyzing surface structures and changing them to their corresponding deep structure. With these, the child is able to select syntactic

descriptions which maximize the probability of determining the underlying and derived structural relationship.⁷⁴

As one can see, Fodor's "innate mechanism" is in the form of specific inference rules that work in specific cases, rather than a list of total solutions to all language data. This makes Fodor a part of the group--mixturists. Fodor has said:

"...the question about innateness is sometimes raised not in terms of the evidence for or against some particular theory about what is innate, but rather in terms of whether anything need be innately contributed at all. The answer to this question must be obvious. Any organism that generalized its experiences at all must, on pain of infinite regress, have some unlearned principles for extrapolation. The dispute between associative theories of language learning and the nativist theory is not over whether there are some innate principles, it is only over the content and complexity of the innate endowment."⁷⁶

Slobin (1966) agrees with McNeill that a LAD is necessary, however, he prefers a process approach where universal characteristics of language are part of the innate structure. Slobin feels that empirical data has disproved McNeill's idea of giving the child credit for having all the rules with which it is necessary to process language. We find that McNeill's work suggests that the child would innately have an entire hierarchy of adult word classes; but, Miller

and Ervin (1964) have found that subjects placed adjectives in both their pivot and open classes. A control approach to LAD would account for this data discrepancy. There would be progressive definement of word classes as the inference rules had an increasingly larger corpus of data on which to work. With the use of these innate rules, on the linguistic data presented, the child could develop the linguistic universal--as well as produce an appropriate grammar. So where McNeill postulates the hierarchy of word classes as innate, Slobin points out that the semantic nature of words and word classes would specify this hierarchy. Slobin suggests that learnable semantic features develop the underlying grammatical categories, which the innate LAD inferred, thus bridging the gap of nativist and learning theorists.

Analysis of the above theories are varied. The major criticism of learning theories of language acquisition is that they do not explain the child's potential for generating and comprehending an enormous number of novel grammatical sentences. Learning theories rarely deal with the fact that comprehension of linguistic units seems to be acquired before production; or why items which have been comprehended are not immediately producible. Comprehension is handled through assertion of an innate (unlearned) mechanism for decoding and manipulating verbal output. Learning theories do appear to adequately describe acquisition of meaning for words, short phrases, and phonological rules.

A criticism of nativist theories is that they tend to suffer from lack of specificity in their explanations. They fail to explain the occurrence of certain overt linguistic phenomena (for example, imitation). Nativists are also in the precarious position of losing explanatory power by assuming too much as innate.

For these and other reasons, it seems most profitable to consider the case presented in a mixture point of view. The universals of language are accounted for by means of innate mechanisms and the principles of S-R conditioning. These are seen as aiding in the child's acquisition of an intricate language system. Taylor and Swinney tend to lean toward Slobin's concept. "Slobin's ideas appear to be quite reasonable and exciting. Positing a general organization of the mind which allows for inductive reasoning, and which can be applied specifically to language (among other things), appears to be the most parsimonious organization of such a varied, all pervading, integrated organ as the human brain."⁷⁷

DeVito has said concerning theories of language acquisition:

"...At the time of this writing, mid-1971, there is no psychological theory that is completely compatible with the linguistic facts. No current theory adequately explains language behavior as it is described by linguists....

....It should be clear that a theory of language is not the same as a theory of a language user. A theory of

language is an abstract characterization of the facts of language. The task of psychology, on the basis of the facts of language contained in the linguistic theory, a model of language performance, a model of how the linguistic competence is utilized. Such a theory,...can only be constructed from complete and accurate data about language. In reality, however, the data on language are far from complete and probably in many respects inaccurate."⁷⁸

Through the research and continued debates, what is bound to emerge will be a more complex image of the psychological nature of man, involving complex internal structures. He will be partly determined genetically, in part determined by the variety and richness of environment through the influence of human culture, and probably only minimally determined by traditional sorts of reinforced stimulus response connections.⁷⁹

Language/Learning Disabilities and Therapy Indications

As we have seen, for all the effort that linguists and researchers name put forth in studying languages relatively little is known concerning the way languages are put together and even less is known about how we understand, generate or acquire the language we speak. There are many different and often incompatible linguistic theories and there are many facts about language which are not taken into account by a theory. No matter how many theories do or do not provide adequate explanation of language, man continues to communicate through the use of language.

One of the most devastating and isolating events which can occur to a human being is failure to acquire language, or a disruption of the language acquisition process. Results of such disruptions can and do have far-reaching educational and societal implications. Much evidence has shown that there are many children who for one reason or another have not achieved a level of another have not achieved a level of language acquisition which allows them to enter fully into the life of the community.

Language users make mistakes, they forget what they were talking about, they hesitate, they change their minds. We have already discussed performance as a description of what a language user actually says and competence as a description of his knowledge. The distinction between competence and performance can be important in therapy. Does a particular case of language pathology represent a deficit in competence or performance?

Psycholinguists are interested in the extent language may actively shape human thought and action. What are the ways in which the growing child's ability to speak may affect the course of his mental development?

Failure to attain skill in language usage results in immeasurable handicaps for a child's general intellectual and cognitive development. Language development is of permanent importance in concept formation, problem solving, thinking, and learning. The "slow" child will experience profound and prolonged academic retardation in classrooms

which place a great deal of value on the child's ability to use language because much of the classroom time from the primary to the mid-elementary grades is devoted to formal and informal classroom discussion. Also, the child may develop problems in emotional and social adjustment as he is faced daily with communicative situations with peers and adults which result in failure and frustration. Parents often discover, after seeking appropriate professional assistance, that there is difficulty in obtaining effective service which provides a complete comprehensive program for their child. A deep-felt strain is felt by the family upon realization that their child is handicapped. But even more frustrating is the lack of effective and sufficient professional services.⁸⁰

After looking at the language acquisition process and current theories it is apparent that the role of language and its related disorders in the emotional, social, and educational growth and development of the child is of considerable consequence.

So far we have discussed the normal process of language acquisition in the normal child. What about the child whose communication is impaired? What factors lead to these difficulties in language? The application of the common practice of referring to language disabilities in relation to etiology has resulted in a semantic conglomeration of confusion. The researchers seem to have concentrated more on etiologies rather than specific characteristics of modification. The

search for an etiology has been frequently unsuccessful and the conclusions found highly speculative.⁸¹ Of course, the etiology and factors maintaining the disability are worth exploring, but an analysis of linguistic behavior should serve as the main focus of the diagnosis and classification. After a reasonable search for etiologies (hearing loss, brain damage, etc.) the next question is--What are the current linguistic characteristics of the child? What is the quantity and quality of the child's language?

1. Has the child acquired any language by age four years when language should be well developed?

2. How delayed is the language usage of a child as compared with his age peers?

3. What is the status of his language usage after the child has acquired adequate language function?⁸²

It is more important to obtain information about the child's level of language development by looking at linguistic abilities for the child in his speech community. This would include the developmental level of speech sounds, vocabulary, concept formation, and sentence formation (syntax). After obtaining a status report of the child's linguistic profile, it is useful in planning the child's training program to determine whether the language disability represents a developmental retardation or was acquired after the development of normal language function.

With all these factors in mind, Michael Marge has constructed a simple and meaningful approach to defining and

classifying the problems of language as follows:

1. Failure to acquire any language. Children who by age four years have not shown any sign of acquiring the language of their speech community.

2. Delayed language acquisition. is below levels attained by their age peers in their speech community. The delay may occur in all, one, or some combination of the phonological, semantic, and syntactic components of the language of their speech community.

3. Acquired language disabilities. Members of a speech community who had at some point in their developmental history acquired the language of their speech community, who subsequent to such adequate language acquisition suffered a complete loss or reduction of their capacity to use the language common to their speech community.

Research has also shown a pertinent relationship between the comprehension and expression of language. For we find children who understand language yet they have not acquired any proficiency in the expression of the language. This seems to imply that the semantic development, involving concept formation, precedes the acquisition of expressive language.

There are certain factors essential for developing skill in language. The most essential factors include normally developing speech and hearing mechanisms, allowing for the reception and understanding of the oral language of others, and the expressions which continue to approximate and finally match an adult's language; a degree of intelligence allowing learning and intellectual functioning; and sufficient environmental stimulation to trigger readiness stages leading from one plateau of language learning to the next.

Interventional Techniques for Language Disabilities

There are two broad categories of Interventional techniques for language Disabilities: 1) diagnostic approaches--the methods which assess the status of the child's disability, attempt to determine etiology and prognosis and suggest appropriate procedures for modifying behavior, and 2) training methods--those procedures which assist the child in attaining language function appropriate to the child's age.

Most diagnostic efforts include the use of standardized and/or unstandardized tests and personal observation to assess the function of the child's speech and hearing mechanisms, intellectual capacity, personality characteristics, health and family history, present general health, and oral language skills. An outline of current tests is presented in the Appendix. The approach is usually on a continuum--either from an examination on a one-time basis to an assessment process which is continuously carried out while the child is in training or from the sole use of the expertise of one discipline--speech pathology, special education, etc.--to an interdisciplinary team approach.

The approaches used for modifying and improving the linguistic behavior of children may 1) emphasize sound-to-language forms and 2) chiefly focus on language forms. In the first approach, children are taught the sounds of language in isolation, proceeding to nonsense syllables, words, phrases and sentences. The second approach is to teach the child

syntactic forms in developmental progression. There are also combinations of both approaches which may teach both sounds and syntax simultaneously.⁸⁴

The primary goal of management and corrective education for all children with language disabilities is to help each child develop effective language ability as soon as possible. The effectiveness of language is all-important for it refers to the development of a language function, especially oral language appropriate for the child's age and maturational level, which allows him to listen, understand, and communicate his thoughts and feelings in a meaningful and understandable manner to peers and adults. Secondary goals identifying specific skills and behaviors for all children resulting from a language training program include:

1. Development of facile expression of thoughts and feelings.
2. Development of "linguistic shifting behavior"--i.e., a skill which allows a speaker to readily adjust from one communicative situation, with its inherent requirements, to another, by adapting to the appropriate oral language needs of the situation.
3. Expansion of the linguistic repertoire of words and concepts.
4. By the use of readiness activities, provision of a linguistic foundation for the further development of language skills, such as reading and writing.
5. Assistance to the child, family, and the school in accepting the language disability without emotional over-reaction and with a great degree of objectivity.⁸⁵

In language correction, each child needs individual specific training according to his needs. Each child is

perceived as a functioning or potentially functioning linguistic system; therefore, the training program should be based in large part on his current and potential linguistic capacity rather than on the limitations which are implied by the etiological category into which he has been placed. The description of his linguistic ability and disability and not the etiology of his disability should determine the form of the management process.

One of the most promising and perhaps the most comprehensive diagnostic tests which analyzes language behavior and avoids etiological classifications is the Illinois Test of Psycholinguistic Abilities (ITPA). It reveals a child's linguistic strengths and weaknesses and also suggests the most appropriate ways to provide a remedial program.

The test appraises linguistic abilities on 1) two levels of language usage--representational and automatic-sequential; 2) three main psycholinguistic processes--decoding, encoding, and association; 3) certain channels of communication--auditory or visual and motor or vocal. (This is based on the theoretical model of language by Osgood.) A clinical model of the ITPA can be seen in the Appendix.

In developing a specific training program and obtaining the direction appropriate for an individual child, utilizing the available diagnostic data, answers to the following questions should be sought:

1. When should the language training program begin?

2. What are the specific goals for the child based on the current status of his language ability?

3. Should the child be seen individually or in a group?

4. How frequently should the child be seen?

5. What ancillary services must be provided?

The literature available on language disabilities in children is rapidly expanding and full of rich and full programs of training. There are three general approaches to language training: 1) phonetic, 2) development of perceptual skills and concept formation, and 3) grammatical approaches. Table 86 in the Appendix summarizes these approaches.

There is a problem of limitations of available manpower resources to language-handicapped children which is compounded by the limitations in the settings where services are offered. The settings where we most often find management services include regular day-school programs, preschool education programs, college and university speech and hearing centers, hospital and community speech and hearing centers, and private practice. The ideal setting for serving the child with a language disability is in the public school.

After this brief look at language disabilities and diagnostics, we can feel the need the child has and the anxiety he must experience.

This paper was designed so that I could gain more insight into the external need of an individual in relation to what is going on inside to make this child the way he is. It has been most beneficial to me.

What is language?

Language for de Saussure..."is a static, unchangable system of pure values which can be established through the associative and syntagmatic relations of signs."⁸⁷

For Sapir, "Language is a dynamic, shifting set of patterns holding among elements capable of signaling four or more concept types, but necessarily signaling at least two types."⁸⁸

As seen by Bloomfield, "Language is a set of conditioned human responses to physical or chemical stimuli....these responses are conditioned."⁸⁹

Hjelmslev has said, "Language...a network of dependence relations that can be considered as independent of phonetics or semantics, but which are instantiated in a given text."⁹⁰

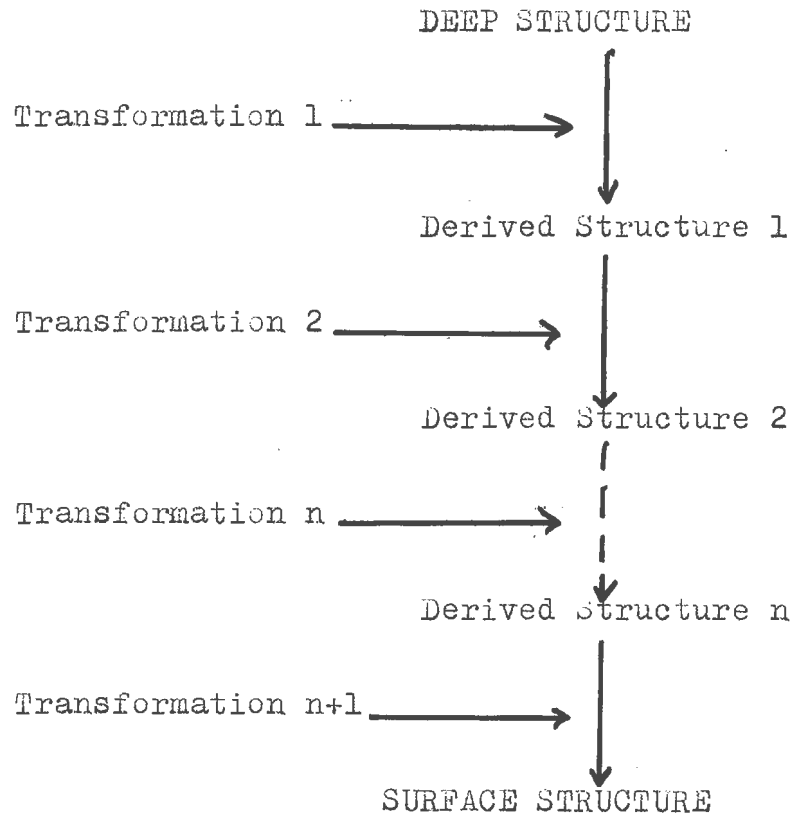
In Syntactic Structures, Chomsky describes language as consisting of three components..language was viewed as consisting of a certain set of substantive and formal factors that are shared by all languages."⁹¹

What is language? Language is understanding--it is communication.

APPENDIX

TABLE A

Every sentence has as many derived structures as transformations are used. This may be represented in the following way:



(Taken from Linguistics, Peter H. Salus, page 23.)

TABLE B
Part of the Grammar of a Child 36 Months Old

Complete phrase-structure rules;

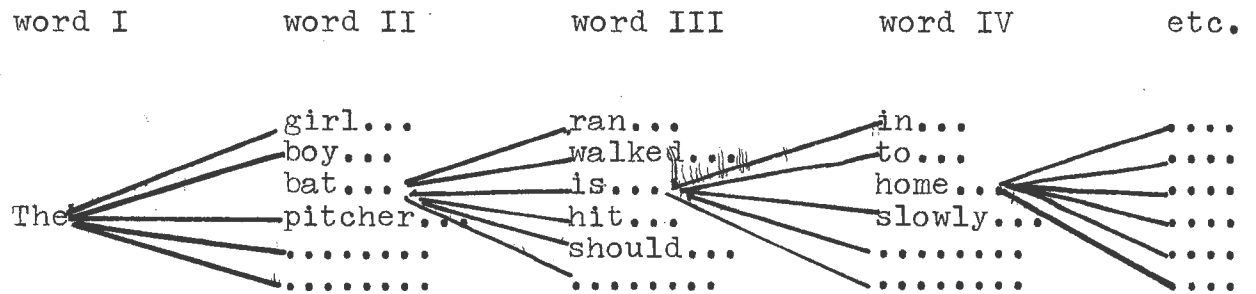
1. S ----> { $\begin{smallmatrix} \text{Imp} \\ \text{Wh} \end{smallmatrix}$ } (Neg) Nominal-Predicate
2. Predicate ----> { $\begin{smallmatrix} \text{MV} \\ \text{Cop} \end{smallmatrix}$ }
3. MV ----> Vb (Comp)
4. VB ----> (Aux) V (Prt)
5. Aux ----> { $\begin{smallmatrix} \text{V}^c \\ \text{B + ing} \\ \text{Past} \end{smallmatrix}$ }
6. Comp ----> { $\begin{smallmatrix} \text{Adverb} \\ \text{Nominal (Adverb)} \end{smallmatrix}$ }
7. Cop ----> B - Pred
8. B ----> { $\begin{smallmatrix} \text{be} \\ \beta \end{smallmatrix}$ }
9. Pred ----> { $\begin{smallmatrix} \text{Det} \\ \text{Nominal} \\ \text{Adverb} \end{smallmatrix}$ }
10. Adverb ----> { $\begin{smallmatrix} \text{Locative} \\ \text{Adv} \\ \text{Prep Phrase} \end{smallmatrix}$ }
11. Locative ----> { $\begin{smallmatrix} \text{somewhere} \\ \text{Adv} \\ \text{Prep Phrase} \end{smallmatrix}$ }
12. Prep Phrase ----> Preposition { $\begin{smallmatrix} \text{Nominal} \\ \text{Adv} \end{smallmatrix}$ }
13. Nominal ----> { $\begin{smallmatrix} \text{some} \\ \text{(one)} \\ \text{(thing)} \end{smallmatrix}$ }
14. NP ----> (Det) N

Two transformation rules

- T1. WH incorporation for main-verb sentences
WH-Nominal-Verb (Nominal) - some ----> WH + some -
Nominal-Berb (Nominal)
- T2. Affixation of Past
X - Pst - V - X ----> X - V+Past - X

(Taken from the Acquisition of Language, David McNeill, page 33.)

TABLE C



(Taken from Principles of Childhood Language Disabilities,
 "the Onset of Language," Orlando Taylor and David Swinney,
 page 55.)

TABLE D
Estimates of Prevalence and Incidence
of Oral Language Disabilities by Type
(Ages 4-17)

<u>Type of language disability</u>	<u>Current Prevalence^a</u>	<u>Incidence^b%</u>
I. Failure to acquire any language		
A. Age 4	A. 22,854 ^c	A. 0.6
B. Ages 4-17	B. 44,745 ^d	B. 0.08
II. Delayed language acquisition	3,467,784 ^e	6.2
III. Acquired language disability	<u>139,830^f</u>	<u>0.25</u>
Total	3,652,359 ^g	6.53

(Taken from Principles of Childhood Language Disabilities,
"The General Problem of Language Disabilities in Children," Marge,
page 91.)

TABLE E
An Outline of Current Tests

I. Input

A. Detection

1. Auditory:
Pure-tone screening and threshold
2. Visual:
Ophthalmologist

B. Perception

1. Auditory:
 - a. Word:
Speech reception threshold
Audiometric speech discrimination
 - b. Phoneme:
Goldman-Fristoe-Woodcock Test of Auditory Discrimination
Wepman's Auditory Discrimination Test
2. Visual
 - a. Form:
Bender-Gestalt Test for Young Children
Frostig Developmental Test of Visual Perception
Meeting Street School Screening Test
 - b. Symbolic (letter and number):
Doren Diagnostic Reading Test of Word Recognition Skills
ITPA-Visual Reception and Visual Closure Subtests
Peabody Individual Achievement Test
Meeting Street School Screening Test

C. Semantic

- Full-Range Picture Vocabulary Test
- ITPA-Auditory Reception, Auditory Vocal Association,
and Visual Motor Association Subtests
- Peabody Picture Vocabulary Test
- Picture Articulation and Language Screening Test (visual)

D. Syntactic

1. Word:
Doren Diagnostic Reading Test of Word Recognition Skills
Durrell Analysis of Reading Difficulty
Michigan Picture Language Inventory
2. Sentence:
Doren Diagnostic Reading Test of Word Recognition Skills
Durrell Analysis of Reading Difficulty

II. Cognitive processes

- Goodenough-Harris Drawing Test
- Illinois Test of Psycholinguistic Abilities (ITPA)
- Meeting Street School Screening Test
- Peabody Individual Achievement Test (PIAT)
- Stanford-Binet Intelligence Scale
- Wechsler Intelligence Scale for Children

III. Output

- A. Semantic
 - Basic Concept Inventory
 - ITPA--Verbal Expression, Manual Expression, and Auditory Vocal Association Subtests
 - Meeting Street School Screening Test
 - PIAT--General Information Subtest
- B. Syntactic
 - 1. Word
 - Berko Test of Exploratory Grammar
 - ITPA--Grammatical Closure Subtest
 - Measures of Verbal Output
 - 2. Sentence
 - Measures of Verbal Output
 - Meeting Street School Screening Test
 - Northwestern Syntax Screening Test
- C. Overt Response
 - 1. Rules
 - a. Phonological
 - Berko Test of Exploratory Grammar
 - ITPA--Grammatic Closure Subtest (with examiner interpretation)
 - b. Graphological
 - Doreen Diagnostic Reading Test of Word Recognition Skills
 - Durrell Analysis of Reading Difficulty
 - 2. Production
 - a. Oral
 - (1) Word
 - Goldman-fristor Test of Articulation--
Sounds-in-Words Subtest
 - Picture Articulation and Language Screening Test
 - Predictive Screening Test of Articulation
 - Templin-Darley Tests of Articulation
 - (2) Co-Articulation
 - Goldman-Fristoe Test of Articulation--
Sounds-in-Sentences Subtest
 - McDonald Deep Screening Test of Articulation
 - Templin-Darley Tests of Articulation
 - b. Gesture
 - Full-Range Picture Vocabulary Test
 - Goldman-Fristoe-Woodcock Test of Auditory Discrimination
 - ITPA--Manual Expression Subtest
 - PIAT--Reading Recognition, Mathematics, Reading Comprehension and Spelling Subtests
 - Peabody Picture Vocabulary Test

- IV. Broad-comprehensive
 - Communication Evaluation Charts
 - Houston Test for Language Development
 - Utah Test of Language Development
 - Verbal Language Development Scale

Traditional Classification of Organically Based Language Deficits

Communicative functions							
Channel	Decoding			Central processing	Assoc.	Encoding	
	Acuity	Discrimination	Assoc.			Motor Patterns	Discrete movements
Auditory	Deafness and hearing loss	Auditory agnosias	Auditory aphasias	Categorizing Problem solving Learning Storage and re-trieval Language acquisition, etc	Oral aphasias	Oral apraxias	Oral paralyses
Visual	Blindness and visual loss	Visual agnosias	Visual aphasiás		Manual aphasias	Manual apraxias	Manual paralyses

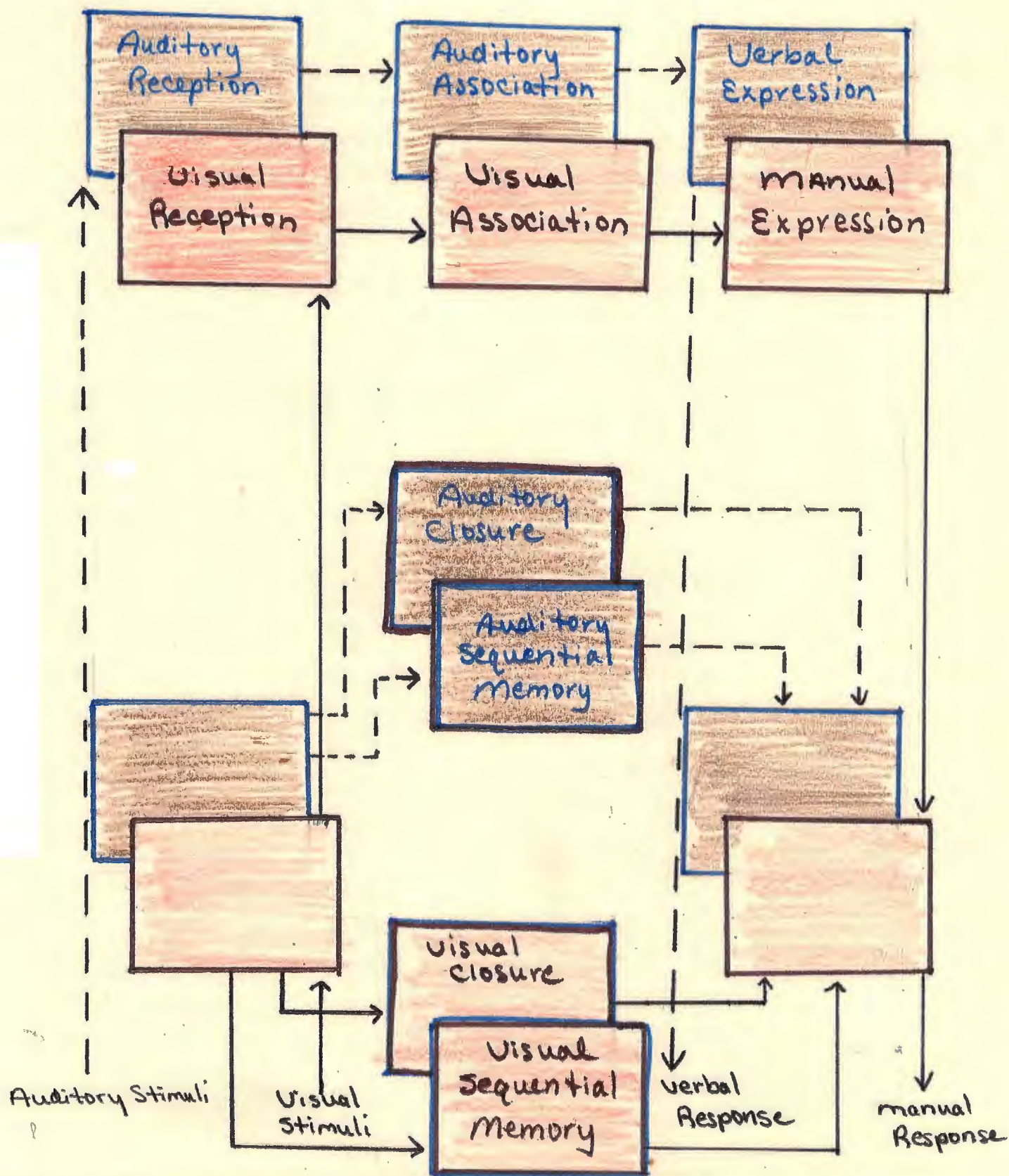
Table F

(Taken from Principles of Childhood Language Disabilities, "Nonmedical Diagnosis and Evaluation", Irwin, Moore and Rampp, page 240.

Table G

(taken from Psycholinguistic Learning Disabilities, p.20)

Clinical model of the ITPA



FOOTNOTES

¹Duffy, Gerald C., Teaching Linguistics, the instructor publications, inc., N.Y.; 1962; p.

²Ibid

³Salus, Peter H., Linguistics Bobs-Merrill Co., Inc., N.Y., 1969; p.

⁴Dinneen, Francis P., An Introduction to General Linguistics, Holt, Rinehart and Winston Inc., 1967, p.

⁵Duffy, Gerald C., op. cit., p.

⁶De Cecco, John P., Readings-The Psychology of Language, Thought and Instruction, Holt, Rinehart and Winston, Inc., 1972, p.

⁷Duffy, Gerald C., op. cit., p.

⁸Dinneen, Francis P., op. cit., p. 20.

⁹Ibid, p. 35.

¹⁰Ibid, p. 35.

¹¹Duffy, Gerald C., Teaching Linguistics, the instructor publications, inc., N.Y., 1962, p.

¹²Ibid

¹³Ibid

¹⁴Irwin, John V. and Micheal Marge, editors, Principles of Childhood Language Disabilities, Appleton-Century-Crofts, Meredith Corporation, N.Y., 1972, p. 11.

¹⁵Ibid

¹⁶Ibid, p. 12.

¹⁷McNeill, David, The Acquisition of Language, The Study of Developmental Psycholinguistics, Harper and Row, N.Y., 1970, pp. 153-154.

¹⁸Irwin, John V. and Micheal Marge, op. cit., p. 12.

¹⁹Dinneen, Francis P., op. cit., p. 63.

²⁰Irwin, John V. and Micheal Marge, op. cit., p. 13.

- ²¹Ibid, pp. 15-16.
- ²²Duffy, Gerald C., op. cit., p. 25.
- ²³De Cecco, John P., op. cit., p. 24.
- ²⁴Ibid, pp. 28-29.
- ²⁵Ibid, p. 29.
- ²⁶Slobin, Dan I., Psycholinguistics, Scott Foresman and Co., Illinois, 1971, p. 16.
- ²⁷Ibid, p.17.
- ²⁸Salus, Peter H., Linguistics, Bobs-Merrill Co., Inc., N.Y., 1969, p. 23.
- ²⁹Ibid, p. 25.
- ³⁰Dinneen, Francis P., An Introduction to General Linguistics, Holt, Rinehart and Winston Inc., 1967, p. 373.
- ³¹Irwin, John V. and Micheal Marge, editors, Principles of Childhood Language Disabilities, Appleton-Century-Crofts, Meredith Corporation, N.Y., 1972, p. 18.
- ³²Chomsky, Noam, Language and Mind, Harcourt Brace and World, Inc, N.Y., 1968, p. 32.
- ³³McNeill, David, op. cit., p. 145.
- ³⁴Salus, Peter H., op. cit., p. 33.
- ³⁵Chomsky, Noam, Syntactic Structures, The Hague, Mouton and Co., N.Y., 1957, p.32.
- ³⁶Dinneen, Francis P., op. cit., p. 374.
- ³⁷Slobin, Dan I., op. cit., p. 22.
- ³⁸Salus, Peter H., op. cit., p. 57.
- ³⁹De Cecco, John P., op. cit., p.2.
- ⁴⁰Chomsky, Noam, "Aspects of the theory of Syntax", Cambridge, Mass., MIT Press, 1965, p. 8.
- ⁴¹Irwin, John V. and Micheal Marge, op. cit., p. 213.
- ⁴²Slobin, Dan I., op. cit., p. 40.
- ⁴³McNeill, David, op. cit., p. 7.
- ⁴⁴Ibid

- ⁴⁵Irwin, John V. and Micheal Marge, op. cit., p. 52.
- ⁴⁶Ibid.
- ⁴⁷Slobin, Dan I., op. cit., p. 40.
- ⁴⁸McNeill, David, op. cit., p. 20.
- ⁴⁹Ibid.
- ⁵⁰Slobin, Dan I., op. cit., p. 40-41.
- ⁵¹De Cecce, John P., op. cit., p.257.
- ⁵²Slobin, Dan I., op. cit., p. 42.
- ⁵³McNeill, David, op. cit., p. 25.
- ⁵⁴Ibid.
- ⁵⁵Slobin, Dan I., op. cit., p. 42.
- ⁵⁶Ibid, p. 43.
- ⁵⁷Ibid, p. 47.
- ⁵⁸Ibid.
- ⁵⁹Irwin, John V. and Micheal, op. cit., p.53.
- ⁶⁰Ibid, p. 54.
- ⁶¹Ibid, p. 55.
- ⁶²Ibid, p. 56.
- ⁶³Ibid, p. 58.
- ⁶⁴De Cecce, John P., op. cit., p. 326-.
- ⁶⁵Irwin, John V. and Micheal Marge, op. cit., p. 58.
- ⁶⁶De Cecce, John P., op. cit., p. 337.
- ⁶⁷Irwin and Marge, op. cit., p. 60.
- ⁶⁸Ibid.
- ⁶⁹Slobin, Dan I., op. cit., p. 56.
- ⁷⁰Ibid, p. 62.
- ⁷¹Irwin and Marge, op. cit., p. 64.

⁷²Chomsky, Noam, "Aspects of the Theory of Syntax", Cambridge, Mass., MIT Press, 1965, pp. 58-59.

⁷³Irwin and Marge, op. cit., p. 63.

⁷⁴Ibid, p. 64.

⁷⁵De Cecco, John P., op. cit., p. 389.

⁷⁶Irwin and Marge, op. cit., p. 65.

⁷⁷Ibid, p. 66.

⁷⁸Devito, Joseph A., Psycholinguistics, The Bobs-Merrill Company, N.Y., 1971, p. 9.

⁷⁹Slobin, Dan I., op. cit., p. 61.

⁸⁰Irwin and Marge, op. cit., p. 76.

⁸¹Ibid, p. 82. ⁸²Ibid, p. 83. ⁸³Ibid, p. 86-87.

⁸⁴Ibid, pp. 93-94. ⁸⁵Ibid, p. 289. ⁸⁶Ibid, p. 306.

⁸⁷Dinneen, Francis P., op. cit., p. 418.

⁸⁸Ibid, ⁸⁹Ibid ⁹⁰Ibid, p. 419. ⁹¹Ibid, p. 420.

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